

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
PART V EXAMINATIONS JUNE 2007
FOUNDATION ENGINEERING DESIGN TCW 5202

INSTRUCTIONS

Answer **ALL QUESTIONS**

Time 3 Hours

Total Marks: 100

QUESTION ONE

(A) Write brief notes on

- (i) Under-reamed piles
- (ii) Load carrying capacity of pile groups

10 Marks

(B) A group of nine piles, 10 meter long is used as a foundation for a bridge pier. The piles are 300mm diameter with centre to centre spacing of 900mm. The sub soil consist of clay with unconfined strength of 150 kN/m^2 . Determine the efficiency of the pile group.

15 Marks

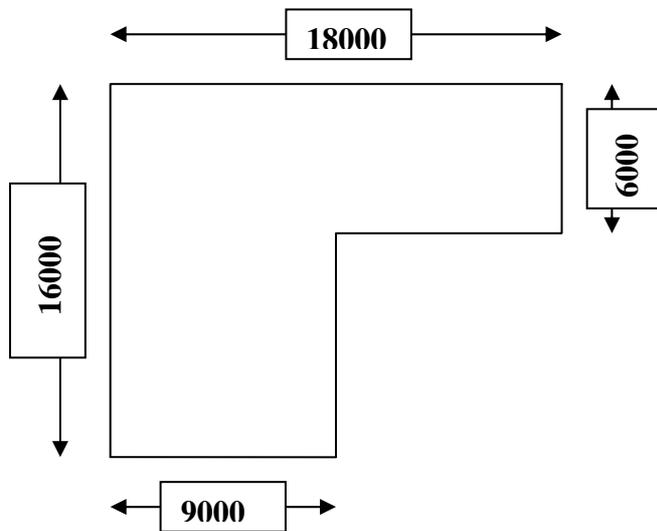
QUESTION TWO

(A) What are the assumptions made in Boussinesq's formulas for stress distribution in soils.

5 Marks

(B) A raft foundation of the dimension shown in the figure carries a uniform distributed load of 300 kN/m^2 . Estimate the vertical pressure at a depth of 9meters below the point **O** marked in the figure.

20 Marks



QUESTION THREE

(A) What is meant by optimum moisture content and how is it determined in the laboratory?

10 Marks

(B) A Proctor compaction test was conducted on a small sample and the following observations were made

Water Content (%)	8.0	11.5	14.5	17.5	19.5	21.5
Dry density Mg/m	1.70	1.90	2.00	1.98	1.95	1.92

Find the maximum dry density and the optimum moisture content

15 Marks

QUESTION FOUR

(A) Define and explain the term “ Soil stabilisation”

5 Marks

(B) Write short notes on any four of the following:

- (i) Soil stabilisation by the use of admixtures
- (ii) Dewatering of ground soils
- (iii) Grouting technique for foundation improvement
- (iv) Sand drains
- (v) Vibro flotation
- (vi) Stone columns

20 Marks